

TRENCH CAPACITOR STRUCTURE

Abstract

Afin-type trench capacitor structure includes a buried plate diffused into a silicon substrate. The buried plate, which surrounds a bottle-shaped lower portion of the trench capacitor structure, is electrically connected to an upwardly extending annular poly electrode, thereby enabling the buried plate and the annular poly electrode to constitute a large-area capacitor electrode of the trench capacitor structure. A capacitor storage node consisting of a surrounding conductive layer, a central conductive layer and a collar conductive layer encompasses the upwardly extending annular poly electrode. A first capacitor dielectric layer isolates the capacitor storage node from the buried plate. A second capacitor dielectric layer and a third capacitor dielectric layer isolate the upwardly extending annular poly electrode from the capacitor storage node.